1. Title: Post-restoration Aquatic Species Assessment on the Bandon Marsh Ni-les'tun Unit of Bandon Marsh National Wildlife Refuge

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3. Project Objectives

   1. Describe the fish species community within and among restoration sites and reference sites before and after the restoration action.
   2. Describe fish species distribution within and among restoration sites and reference sites before and after the restoration action.
   3. Describe fish species relative abundance within and among restoration sites and reference sites before and after the restoration action.
   4. Collect invertebrates to archive from restoration sites and reference sites before and after the restoration action.

4. Methods

   The methods will follow those established during the pre-restoration assessment (Hudson et al. 2011), and modified to the new physical features of the marsh during the interim assessment (2011-2012), as outlined below.

Fish Sampling
   Stream sections in Fahys and Redd creeks were originally differentiated by habitat characteristics, resulting in 6 sections for Fahys Creek and 1 section for Redd Creek. For Sections 1-4 in Fahys Creek and Section 1 in Redd Creek, we have maintained a systematic approach using two hoop nets, placed cod end to cod end with wings, providing the ability to block all, or at least the majority of, a channel during a sampling period. After testing a variety of approaches and designs while working at the Nestucca Bay NWR (USFWS *unpublished data*, Little Nestucca River Restoration, NFWF Project #2006-0175-003), this technique was determined to be the most successful approach for collecting a representative fish sample. Random sample sites (Fahys n=9; Redd n=3), each representing 50 m reaches, were identified across the five sections of the two streams. Fishing occurs overnight for over 21 hours, on average, resulting in sampling nearly two tidal cycles. By blocking channels in both directions fish can be captured on both incoming and outgoing tides or by upstream and downstream movements.
   Electrofishing is conducted in sections 5 – 6 of Fahys Creek using Smith Root LR-24 electrofisher. Sampling is conducted working upstream with two netters. Electrofishing is completed twice a year, once in the fall and once in the spring.
   Following the restoration action, an expanded network of tidal marsh channels existed. The original sample design described above for Fahys and Redd creeks was expanded to include seining random, spatially balanced 50 m reaches. Approximately 20 of these reaches will be sampled annually in a rotating panel design. An unbagged, 15.20 m long, 1.8 m deep, 0.6 cm mesh seine with float and lead lines is used to sample.
   Two reference sites are sampled in the Bandon Marsh Unit that is historically a separate non-diked tidal marsh with functioning natural channels on the west side of the refuge. One random sample site, each representing a 50 m reach, was identified per channel (section). Reference-1 (REF-1) is located west of Hwy 101 and south of the river and Reference-2 (REF-2) is located southwest of REF-1. Both hoop nets and seines are used to sample as described above.

To gather information on fish community in the river, four beach seine sites were sampled on the mainstem Coquille River adjacent to Bandon Marsh NWR. Four sample sites, each representing a 50 m reach, were chosen in the section of the Coquille River spanning 50 m upstream of Redd Creek to 50 m downstream of Fahys Creek. These sites were chosen based on spatial dispersion through the section and accessibility. All sites are on the north bank of the Coquille River. Seine 1 (SEINE-1) is located just downstream of the mouth of Fahys Creek. Seine 2 (SEINE-2) is located directly south of the bunkhouse. Seine 3 (SEINE-3) is located approximately 100 m downstream from the mouth of Redd Creek. Seine 4 (SEINE-4) is located just upstream of the mouth of Redd Creek. Seining was conducted as described for the reference sites.

Fish captured in each net are visually identified and measured for fork length (mm). Weight (g) is collected on all salmonid species. All fish are released at the site of capture immediately following workup.

Macro-invertebrate Sampling

Invertebrate sampling reaches are located on either end and between each of the hoop net sites for Sections 1-4 in Fahys Creek. Sections 5 and 6 are combined to represent one reach. Sampling was also conducted at REF-1. There are a total of 11 reaches between the two areas. Water column and water surface samples are collected using a 250 micron-mesh net with a 30.5 cm^2 opening and a one meter long capture bag that tapered down into a 500 ml collection bottle. Three of these nets were used alongside each other. In the center of each net was a 2030R standard mechanical flow meter. Collected invertebrate specimens were transferred and stored in 500 ml bottles filled with isopropyl alcohol. All samples were preserved. Efforts were taken so that sampling methods provided both quantitative and qualitative results that could be compared throughout the range of sites as well as with future surveys.

5. Project Implementation Timeline

- November 2011 – Sampling trip 1 data collection, data entry, and QC
- January 2012 – Sampling trip 2 data collection, data entry, and QC
- March 2012 – Sampling trip 3 data collection, data entry, and QC
- May 2012 – Sampling trip 4 data collection, data entry, and QC
- July 2012 – Sampling trip 5 data collection, data entry, and QC
- September 2012 – Sampling trip 6 data collection, data entry, and QC
- October 2012 – Data analysis
- November 2012 – Annual progress report completed

6. Funding Priority Objectives

This work is relevant to several funding priority objectives identified in the RFP:

- Inventory Project/Collection of Baseline Data – The proposed work provides baseline community structure and distribution information on aquatic species, including a listed salmon and several other Federal trust fish species, immediately following the restoration action at Bandon Marsh NWR. This year and next year are critical for establishing that baseline for a long term monitoring approach that is designed to detect changes in aquatic species community structure and distribution. Along with the data collected prior to the restoration action, and during the interim phase, this baseline information and future data collected will inform managers of the biological response of aquatic species to the restoration action.
- Adaptive Management – The work being conducted through this and other similar monitoring efforts is quantitatively informing managers of the success (or failure) of tidal marsh restoration actions. That information can be used to appropriately plan for similar future actions.
- Data Compilation and Management – The data being collected through implementation of the proposed work is being collected and maintained in a systematic approach that has been utilized in previous monitoring phases of this restoration action as well as in monitoring associated with a

similar action at Nestucca Bay NWR. The standardized sampling design, data compilation, data management and data analysis approaches lend themselves to spatial and/or temporal comparisons.

- Protocol Development – Implementation of the proposed work allows for the continued testing and demonstration of the effectiveness of the standardized approaches developed and being utilized.
- Evaluate the Effects of Climate Change or Other Stressors – Baseline data collected through implementation of the proposed work will lend itself for comparison in a long term monitoring database to evaluate potential effects of climate change.
- Leverage Existing Programs Supporting Surveys on Refuges – The Columbia River Fisheries Program Office has conducted considerable work toward better understanding the aquatic resources on several NWRs in Region 1 including Bandon Marsh NWR, Nestucca Bay NWR, Lewis and Clark NWR, Julia Butler Hansen NWR, Ridgefield NWR, Franz Lake NWR, Pierce NWR, Hanford Reach National Monument, Malheur NWR, and Hart Mountain NWR. This continued partnership between Fisheries and National Wildlife Refuges will ensure that CRFPO can continue to contribute its considerable expertise of aquatic species to support natural resource and information priorities shared among Service programs at both regional and national scales.

7. Project Justification

The proposed work continues an aquatic species assessment and monitoring program at Bandon Marsh NWR focused on the 430 acre tidal marsh restoration on the Ni-les'tun Unit. This larger project represents the largest tidal marsh restoration on the Oregon coast to date. The assessment and monitoring work conducted to this point has been toward the goal of having the best scientific understanding of the expected benefits of this restoration action. Implementation of the proposed work will ensure the baseline information is collected for understanding those expected benefits with respect to aquatic species response to this specific action (i.e., how does a restoration project like this affect the aquatic community?). The understanding gained from this project can be used by managers of National Wildlife Refuges to inform their decisions on similar projects at coastal refuges in the future. The Bandon Marsh NWR CCP is presently being developed with public review expected during mid-2012, however, the proposed work will support the preliminary preferred alternative relative to biological monitoring (i.e., expand data collection to include fish) and research and scientific assessments (i.e., continue existing research, identify needs and cooperate with partners), which were recently presented in Planning Update 2.

8. Project Deliverables

Implementation of the proposed work will result in an annual progress report documenting the data collected and including descriptive analyses. Ultimately, this information will be included in a more comprehensive report (expected completion near end of CY 2013) documenting and comparing short term assessment and monitoring data collected before and after the restoration action (2007-2013) at Bandon Marsh NWR. This comprehensive report can be used by NWR managers to better understand potential aquatic species benefits from similar restoration actions, therefore, informing their decision making process. This report will also serve as baseline information against which long term monitoring data can be compared.

9. Statistical/GIS Support

The Columbia River Fisheries Program Office has statistical and GIS support in house.

10. Requested Funding

$25,000